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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/325,099	06/03/1999	ALEXANDER SHVARTS	4498	2396

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EXAMINER	
FAN, CHIEH M	
ART UNIT	**PAPER NUMBER**
2634	14

DATE MAILED: 08/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/325,099	SHVARTS ET AL.	
	Examiner	**Art Unit**	
	Chieh M Fan	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 June 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5,7-12,14 and 16-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5,7,12,14,16-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 January 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

This Office Action is in response to the Request for Continued Examination (RCE) filed on 6/25/03.

In the amendment filed with the RCE, the applicant listed claims 4, 6, 13 and 15 as "original". The applicants are reminded that claims 4, 6, 13 and 15 were cancelled in the amendment filed 9/25/02. The applicants need to mark the claims identified above as "cancelled" in the next communication.

Drawings

1. The applicants apparently indicate that formal drawings are filed with the amendment. However, the examiner cannot find such formal drawings. Further, the drawings are objected to for the following reasons.

a. As shown in Fig. 3, the oscillators 90 and 92 receive the same signal. However, oscillators 90 and 92 apparently should receive different signals (one for GSM standard and one for DCS standard, see the specification on page 9). Therefore, the drawings should be changed to show oscillators 90 and 92 receive different signals from LPF 88 (i.e., from two separate paths).

b. The proposes drawing changed filed 1/21/03 shows element 100 in Fig. 3 is a summer. However, according to the specification (lines 7-9, page 9), element 100 apparently is a switch.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 5, 7-10, 14, 16-19, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Herzinger (EP 0,905,879) in view of Damgaard et al. (U.S. Patent No. 6,208,875, "Damgaard" hereinafter).

Regarding claim **1**, Herzinger discloses a translation loop modulator (see Fig. 2 and the English abstract) for transmission circuit in a communication system, said translation loop modulator comprising:

input modulation means ("QM" and "BP" in Fig. 2) for receiving at least one input signal ("f_I" and "f_Q" in Fig. 2) that is representative of information to be modulated, for receiving a feedback signal ("f_{MO}" in Fig. 2), and for producing an intermediate modulated signal (output from "BP" in Fig. 2) responsive to said input signal and said feedback signal;

comparator means ("FT1", "FT2", "PFD", "CP", "LF" and "HF-VCO" in Fig. 2) for receiving said intermediate modulated signal (output from "BP" in Fig. 2) and a reference signal ("f_{LO}" in Fig. 2) having a frequency of F_{LO}, and for producing an output transmission signal ("A" in Fig. 2) having a frequency of F_{OUT} responsive to said intermediate modulated signal and said reference signal, wherein said comparator means includes a first frequency divider unit ("FT1" in Fig. 2) for providing a to divide by m function and a second frequency divider unit ("FT2" in Fig. 2) for providing a divide by n function such that $F_{LO} = F_{OUT} / (1 - m/n)$ (see the mathematical expression in col. 4, line 49, also see right column on page 3 of the English translation of DE 19743207 provided by the applicant), and

feedback circuitry ("M1" and "TP" in Fig. 2) coupled to said output transmission signal ("A" in Fig. 2), coupled to said reference signal ("f_{LO}" in Fig. 2) and coupled to said input modulation means ("QM" and "BP" in Fig. 2), said feedback circuitry for producing said feedback signal ("f_{MO}" in Fig. 2) responsive to said output transmission signal and said reference signal.

Herzinger does not teach that the translation loop modulator may be operated in a second mode such that $F_{LO} = F_{OUT} / (1 + m/n)$. That is, Herzinger does not teach the feature of dual band operation.

However, Damgaard teaches that there is a need for mobile phones to operate with dual band transmissions to increase system capacity, so that the system could select between two transmission frequency bands depending upon which bandwidth is less saturated and could provide a better signal quality (col. 1, lines 30-35). Damgaard

also teaches the dual operation may be achieved by selecting the output of a mixer (with inputs RF_{OUT} and RF_{LO}) to be either $RF_{OUT} - RF_{LO}$ or $RF_{LO} - RF_{OUT}$ (col. 5, lines 53-62). When the mobile phone is operated in GSM mode, $RF_{LO} - RF_{OUT}$ is selected. When the mobile phone is operated in DCS mode, $RF_{OUT} - RF_{LO}$ is selected. (See col. 6, line 49 through col. 7, line 8)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select the output of the mixer ("M1" in Fig. 2) of Herzinger to be either $RF_{VCO} - RF_{LO}$ or $RF_{LO} - RF_{VCO}$ such that the modulator of Herzinger may be operated in dual band (DCS mode and GSM mode) for the advantage of increasing system capacity. Note that the relationship $F_{LO} = F_{OUT} / (1 + m/n)$ is an inherent property when the DCS mode (i.e., $RF_{VCO} - RF_{LO}$) is selected. Such relationship may be derived by simple mathematical manipulations.

Regarding claim **5**, Herzinger also teaches an input port of said second frequency divider unit ("FT2" in Fig. 2) is coupled to said reference signal ("f_{LO}" output from "LO" in Fig. 2), and an output port of said second frequency divider unit is coupled to a phase comparator device ("PFD" in Fig. 2).

Regarding claim **7**, Herzinger also teaches an input port of said first frequency divider unit ("FT1" in Fig. 2) is coupled to said intermediate modulated signal (the output from "BP" in Fig. 2), and said output port of said first frequency divider unit is coupled to a phase comparator device ("PFD" in Fig. 2).

Regarding claim **8**, Herzinger also teaches said feedback circuitry ("M1" and TP" in Fig. 2) includes a mixer device ("M1" in Fig. 2) including a first input port coupled to

said output transmission signal ("A" in Fig. 2), a second input port coupled to said reference signal ("f_{LO}" in Fig. 2), and an output port coupled to said feedback signal ("f_{MO}" in Fig. 2).

Regarding claim **9**, Herzinger also teaches said reference signal is directly connected to said mixer device (as seen in Fig. 2, the reference signal "f_{LO}" is directly connected to the mixer device "M1").

Regarding claim **10**, Herzinger teaches a translation loop modulator (see Fig. 2 and the English abstract) for a transmission circuit in a communication system, said translation loop modulator comprising:

quadrature modulation means ("QM" and "BP" in Fig. 2) for receiving at least one input signal ("f_I" and "f_Q" in Fig. 2) that is representative of information to be modulated, for receiving a feedback signal ("f_{MO}" in Fig. 2), and for producing an quadrature modulated signal (output from "BP" in Fig. 2) responsive to said input signal and said feedback signal;

phase comparator means ("FT1", "FT2", "PFD", "CP", and "LF" in Fig. 2) for receiving said quadrature modulated signal (output from "BP" in Fig. 2) and a reference signal ("f_{LO}" in Fig. 2) having a frequency F_{LO}, and for producing a phase comparator signal (output from "LF" in Fig. 2) responsive to said quadrature modulated signal and said reference signal, said phase comparator means including a first frequency divider unit ("FT1" in Fig. 2) for providing a divide by m function and a second frequency divider unit ("FT2" in Fig. 2) for providing a divide by n function;

oscillator means ("HF-VCO" in Fig. 2) for receiving said phase comparator signal (output from "LF" in Fig. 2), and for producing an output transmission signal ("A" in Fig. 2) responsive to said phase comparator signal, said output transmission signal having a frequency F_{OUT} wherein $F_{OUT} = F_{LO}$ (1 - m/n) (see the mathematical expression in col. 4, line 49, also see right column on page 3 of the English translation of DE 19743207 provided by the applicant); and

feedback circuitry ("M1" and "TP" in Fig. 2) coupled to said output transmission signal ("A" in Fig. 2), coupled to said reference signal ("f_{LO}" in Fig. 2) and coupled to said quadrature modulation means ("QM" and "BP" in Fig. 2), said feedback circuitry for producing said feedback signal ("f_{MO}" in Fig. 2) responsive to said output transmission signal and said reference signal.

Herzinger does not teach that the translation loop modulator may be operated in a second mode such that $F_{LO} = F_{OUT} / (1 + m/n)$. That is, Herzinger does not teach the feature of dual band operation.

However, Damgaard teaches that there is a need for mobile phones to operate with dual band transmissions to increase system capacity, so that the system could select between two transmission frequency bands depending upon which bandwidth is less saturated and could provide a better signal quality (col. 1, lines 30-35). Damgaard also teaches the dual operation may be achieved by selecting the output of a mixer (with inputs RF_{OUT} and RF_{LO}) to be either $RF_{OUT} – RF_{LO}$ or RF_{LO} - RF_{OUT} (col. 5, lines 53-62). When the mobile phone is operated in GSM mode, RF_{LO} - RF_{OUT} is selected.

When the mobile phone is operated in DCS mode, RF_{OUT} - RF_{LO} is selected. (See col. 6, line 49 through col. 7, line 8)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select the output of the mixer ("M1" in Fig. 2) of Herzinger to be either $RF_{VCO} - RF_{LO}$ or $RF_{LO} - RF_{VCO}$ such that the modulator of Herzinger may be operated in dual band (DCS mode and GSM mode) for the advantage of increasing system capacity. Note that the relationship $F_{LO} = F_{OUT} / (1 + m/n)$ is an inherent property when the DCS mode (i.e., $RF_{VCO} - RF_{LO}$) is selected. Such relationship may be derived by simple mathematical manipulations.

Regarding claim **14**, Herzinger also teaches an input port of said second frequency divider unit ("FT2" in Fig. 2) is coupled to said reference signal ("f_{LO}" output from "LO" in Fig. 2), and an output port of said second frequency divider unit is coupled to a phase comparator device ("PFD" in Fig. 2).

Regarding claim **16**, Herzinger also teaches an input port of said first frequency divider unit ("FT1" in Fig. 2) is coupled to said intermediate modulated signal (the output from "BP" in Fig. 2), and an output port of said first frequency divider unit is coupled to a phase comparator device ("PFD" in Fig. 2).

Regarding claim **17**, Herzinger also teaches said feedback circuitry ("M1" and TP" in Fig. 2) includes a mixer device ("M1" in Fig. 2) including a first input port coupled to said output transmission signal ("A" in Fig. 2), a second input port coupled to said reference signal ("f_{LO}" in Fig. 2), and an output port coupled to said feedback signal ("f_{MO}" in Fig. 2).

Regarding claim **18**, Herzinger also teaches said reference signal is directly connected to said mixer device (as seen in Fig. 2, the reference signal "f_{LO}" is directly connected to the mixer device "M1").

Regarding claim **19**, Herzinger teaches a translation loop modulator (see Fig. 2 and the English abstract) for a transmission circuit in a communication system, said translation loop modulator comprising:

quadrature modulation means ("QM" and "BP" in Fig. 2) for receiving at least one input signal ("f_I" and "f_Q" in Fig. 2) that is representative of information to be modulated, for receiving a feedback signal ("f_{MO}" in Fig. 2), and for producing an quadrature modulated signal (output from "BP" in Fig. 2) responsive to said input signal and said feedback signal;

first frequency divider means ("FT1" in Fig. 2) for receiving said quadrature modulated signal (output from "BP" in Fig. 2), and for producing a first frequency divided signal (output from "FT1" in Fig. 2) responsive to said quadrature modulated signal such that said first frequency divider means provides a divide by m function;

second frequency divider means ("FT2" in Fig. 2) for receiving a reference signal ("f_{LO}" in Fig. 2), and for producing a second frequency divided signal ("f_{PD}" in Fig. 2) responsive to said reference signal such that said first frequency divider means provides a divide by n function;

phase comparator means ("PFD", "CP", and "LF" in Fig. 2) for receiving said first frequency divided signal and said second frequency divided signal, and for producing a

phase comparator signal (output from "LF" in Fig. 2) responsive to said first and second frequency divided signals;

oscillator means ("HF-VCO" in Fig. 2) for receiving said phase comparator signal (output from "LF" in Fig. 2), and for producing an output transmission signal ("A" in Fig. 2) having a frequency F_{OUT} responsive to said phase comparator signal such that $F_{OUT} = F_{LO} (1 \pm m/n)$ (see the mathematical expression in col. 4, line 49, also see right column on page 3 of the English translation of DE 19743207 provided by the applicant); and

feedback circuitry ("M1" and "TP" in Fig. 2) coupled to said output transmission signal ("A" in Fig. 2), coupled to said reference signal ("f_{LO}" in Fig. 2) and coupled to said quadrature modulation means ("QM" and "BP" in Fig. 2), said feedback circuitry for producing said feedback signal ("f_{MO}" in Fig. 2) responsive to said output transmission signal and said reference signal.

Herzinger does not teach that the translation loop modulator may be operated in a second mode such that $F_{LO} = F_{OUT} / (1 + m/n)$. That is, Herzinger does not teach the feature of dual band operation.

However, Damgaard teaches that there is a need for mobile phones to operate with dual band transmissions to increase system capacity, so that the system could select between two transmission frequency bands depending upon which bandwidth is less saturated and could provide a better signal quality (col. 1, lines 30-35). Damgaard also teaches the dual operation may be achieved by selecting the output of a mixer (with inputs RF_{OUT} and RF_{LO}) to be either $RF_{OUT} - RF_{LO}$ or $RF_{LO} - RF_{OUT}$ (col. 5, lines 53-62). When the mobile phone is operated in GSM mode, $RF_{LO} - RF_{OUT}$ is selected.

When the mobile phone is operated in DCS mode, RF_{OUT} - RF_{LO} is selected. (See col. 6, line 49 through col. 7, line 8)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select the output of the mixer ("M1" in Fig. 2) of Herzinger to be either $RF_{VCO} - RF_{LO}$ or $RF_{LO} - RF_{VCO}$ such that the modulator of Herzinger may be operated in dual band (DCS mode and GSM mode) for the advantage of increasing system capacity. Note that the relationship $F_{LO} = F_{OUT} / (1 + m/n)$ is an inherent property when the DCS mode (i.e., $RF_{VCO} - RF_{LO}$) is selected. Such relationship may be derived by simple mathematical manipulations.

Regarding claim **21**, as explained above in the rationale applied to claim 19, Herzinger in view of Damgaard may be operated in DCS mode (about 1800 MHz).

Regarding claim **22**, as explained above in the rationale applied to claim 19, Herzinger in view of Damgaard may be operated in GSM mode (about 900 MHz).

4. Claims 2, 3, 11, 12 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Herzinger (EP 0,905,879) in view of Damgaard et al. (U.S. Patent No. 6,208,875, "Damgaard" hereinafter) as applied to claims 1, 5, 7-10, 14, 16-19, 21 and 22 above, and further in view of Jaffe (US Patent 5,130,670).

Regarding claim **2**, Herzinger in view of Damgaard teaches the claimed invention (see the rationale applied to claim 1 above) including an oscillating means ("LO" in Fig. 2 of Herzinger) for generating the reference signal ("f_{LO}" in Fig. 2 of Herzinger), but fails

to teach that the oscillating means is a reference loop modulator, i.e., a feedback loop configuration.

Jaffe teaches that an oscillating means (16' in Fig. 4) is implemented with a phase locked loop (52', 54', 56', 58', 66, 64', 60' and 62' in Fig. 7). The phase locked loop comprises a stability enhancement circuit (66 in Fig. 7) so as to generate a stable output oscillating signal.

It is desirable to generate a stable reference signal in the translation loop modulator of Herzinger so as to generate a stable output transmission signal ("A" in Fig. 2 of Herzinger). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the oscillating means of Herzinger with a phase locked loop, as taught by Jaffe, so as to generate a stable reference signal and consequently to generate a stable output transmission signal.

Regarding claim **3**, Jaffe teaches the claimed limitation "said reference loop modulator includes a fractional n synthesizer" because Jaffe teaches that the oscillating means 16' is a fractional n synthesizer (col. 16, lines 62-63).

Regarding claim **11**, Herzinger in view of Damgaard teaches the claimed invention (see the rationale applied to claim 10 above) including an oscillating means ("LO" in Fig. 2 of Herzinger) for generating the reference signal ("f_{LO}" in Fig. 2 of Herzinger), but fails to teach that the oscillating means is a reference loop modulator, i.e., a feedback loop configuration.

Jaffe teaches that an oscillating means (16' in Fig. 4) is implemented with a phase locked loop (52', 54', 56', 58', 66, 64', 60' and 62' in Fig. 7). The phase locked

loop comprises a stability enhancement circuit (66 in Fig. 7) so as to generate a stable output oscillating signal.

It is desirable to generate a stable reference signal in the translation loop modulator of Herzinger so as to generate a stable output transmission signal ("A" in Fig. 2 of Herzinger). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the oscillating means of Herzinger with a phase locked loop, as taught by Jaffe, so as to generate a stable reference signal and consequently to generate a stable output transmission signal.

Regarding claim **12**, Jaffe teaches the claimed limitation "said reference loop modulator includes a fractional n synthesizer" because Jaffe teaches that the oscillating means 16' is a fractional n synthesizer (col. 16, lines 62-63).

Regarding claim **20**, Herzinger in view of Damgaard teaches the claimed invention (see the rationale applied to claim 19 above) including an oscillating means ("LO" in Fig. 2 of Herzinger) for generating the reference signal ("f_{LO}" in Fig. 2 of Herzinger), but fails to teach that the oscillating means is a reference loop modulator, i.e., a feedback loop configuration.

Jaffe teaches that an oscillating means (16' in Fig. 4) is implemented with a phase locked loop (52', 54', 56', 58', 66, 64', 60' and 62' in Fig. 7). The phase locked loop comprises a stability enhancement circuit (66 in Fig. 7) so as to generate a stable output oscillating signal.

It is desirable to generate a stable reference signal in the translation loop modulator of Herzinger so as to generate a stable output transmission signal ("A" in Fig.

2 of Herzinger). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the oscillating means of Herzinger with a phase locked loop, as taught by Jaffe, so as to generate a stable reference signal and consequently to generate a stable output transmission signal.

Response to Arguments

5. Applicant's arguments with respect to claims 1-3, 5, 7-12, 14 and 16-22 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chieh M Fan whose telephone number is (703) 305-0198. The examiner can normally be reached on Monday-Friday 8:00AM-5:30PM, Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (703) 305-4714. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4750.

Chieh M Fan
Primary Examiner
Art Unit 2634

cmf
August 8, 2003